

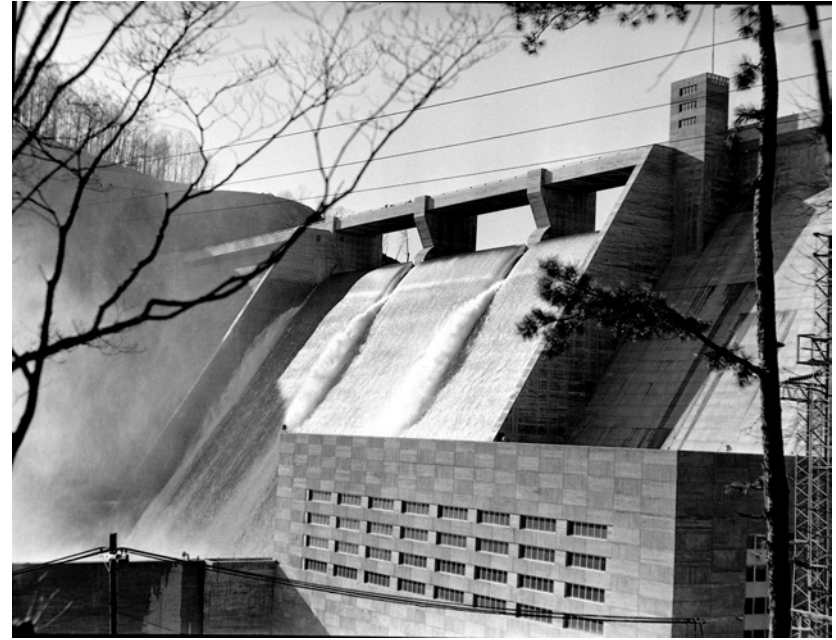
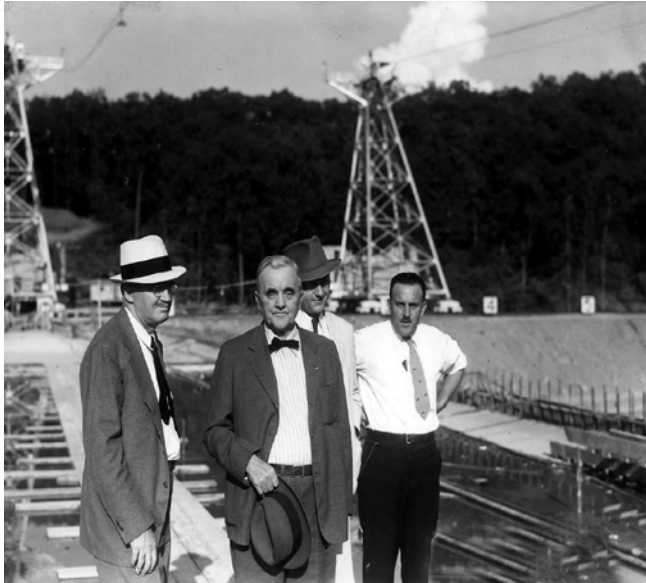


Renewable Energy

Steve Noe

Manager, Mid-Scale Renewables

November 14, 2018



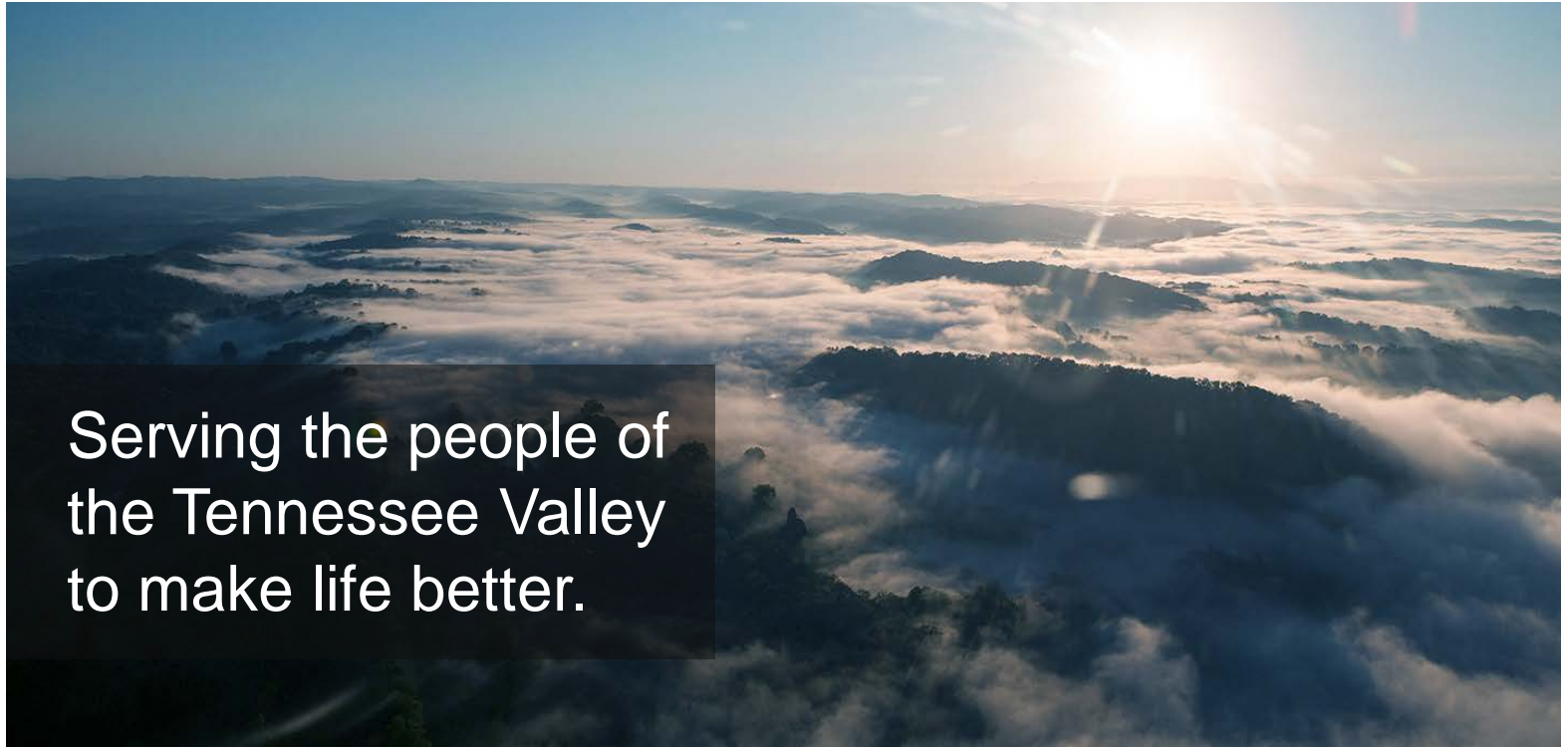




What is TVA?



Our Mission:



Serving the people of
the Tennessee Valley
to make life better.

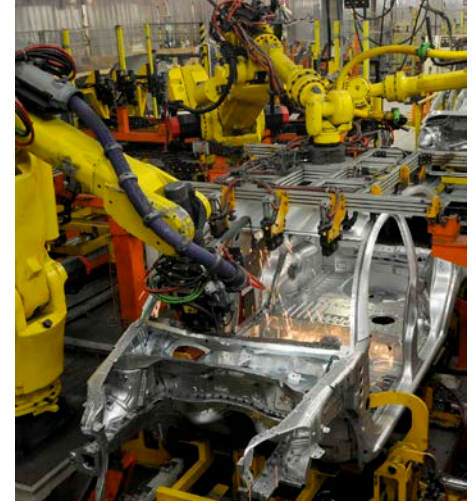
TVA's Mission of Service



Energy



Environment



Economic
Development

TVA

The Tennessee Valley Authority is a corporate agency of the United States that provides electricity for business customers and local power distributors serving 9 million people in parts of seven southeastern states.



TVA provides flood control, navigation and land management for the Tennessee River system.



TVA assists local power companies and state and local governments with economic development to help create and retain jobs.

Customers in the Valley

154 | 58

Local Power Companies



A Touchstone Energy Cooperative



Directly-Served Customers

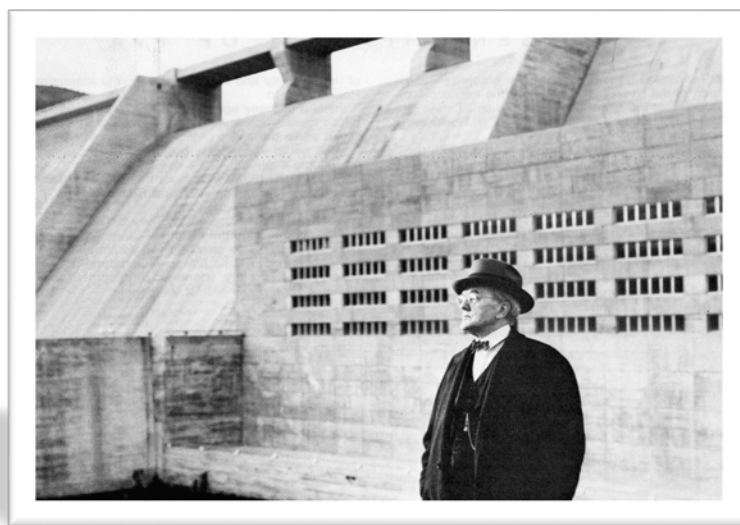


What We Do

- Serve 7 states, and 80,000 square miles
- Generate ~ \$11 billion in annual revenue
- Manage the Valley's river systems and environmental resources



FDR & the TVA Act 1933



"Father of TVA," Senator George Norris

“Power is really a secondary matter.... TVA is primarily intended to change and to improve the standards of living of the people....”

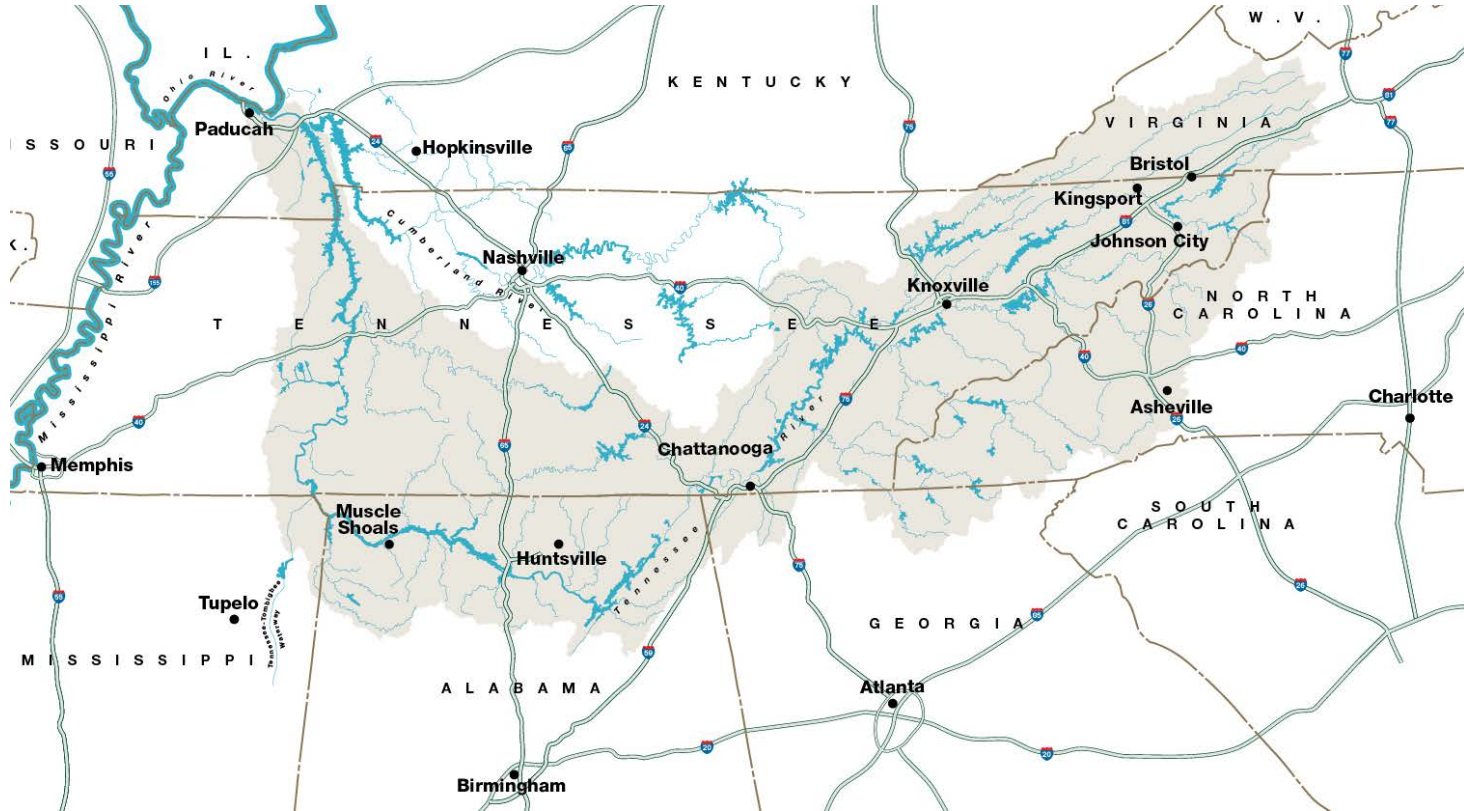
President Franklin D. Roosevelt

A wide-angle photograph of a calm lake at sunset. The sky is a mix of soft orange, pink, and blue, with the sun's glow reflecting on the water's surface. In the distance, a range of low mountains or hills is visible under a hazy sky. On the right side of the frame, two people are in a red canoe, paddling across the water. The water is still, creating clear reflections of the sky and the distant land. On the left, the dark silhouette of a tree branch hangs into the frame.

Environment- Managing Natural Resources

Flood Control • Transportation • Power Production
Recreation • Water Quality • Land Use

Tennessee River Watershed



River System Management

29 hydroelectric dams

Flood damage averted:
\$240 million annually

\$7 billion averted
since 1936

20 non-power dams

January 2013:
\$800 million averted

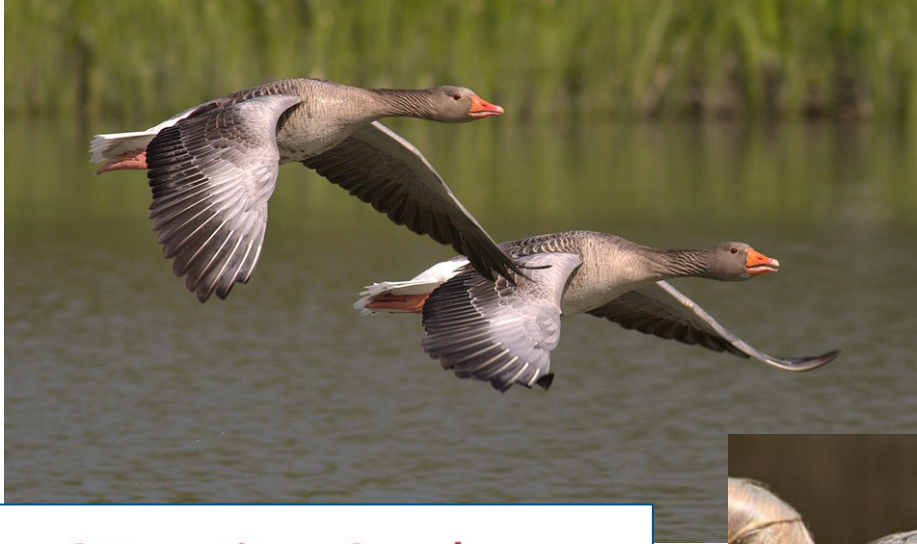
Transportation



Flood Control



Water Quality



Attention Anglers



Lake Sturgeon have been stocked in this area. Please report the catch of this "State Endangered" species to the TWRA at (800) 332-0900



It is illegal to possess this species

Release immediately



Recreation



Land Use



Power Production





Energy

Generation Outlook

- Load growth flat to slightly declining
- Generation fleet is adequate to meet existing demand
- Integrated Resource Plan projects utility scale solar additions in the 2020 – 2025 timeframe
- Customer interest in renewable is growing
- Corporate commitment to renewable and carbon neutral goals are increasing



Market Drivers



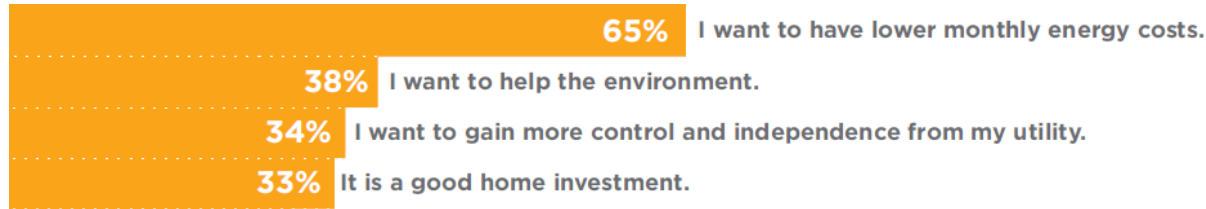
Reliable, Low Cost Energy Remains Important...

Which is most important to you...	Total n=1312
Reliable electricity	39%
Low cost electricity	29%
Having electricity generated from renewable sources	28%
Don't know/Declined	4%

*Note: Base size too low to report reliable results.

BASE: All Qualified General Public Respondents Q1155. Between [READ LIST 1-3] which is most important to you?

Consumer Interest in Solar is Increasing



Most under
estimate the
cost and are
not familiar
with
community
solar

For Many C&I Customers... Sustainability Matters

66%

of business decision makers in the US and Canada expect to **increase their reliance on renewable generated electricity**

Sales of consumer goods from brands with a demonstrated **commitment to sustainability** have **grown more than 4%** globally in the past year, while those **without grew less than 1%.**

Source: 2015 Nielsen Global Corporate Sustainability Report

86%

of the largest companies in America now publish an annual sustainability report

Commercial Customers:

50%

are interested in buying directly from a solar energy provider if the option were available

Source:

C&I Marketplace Initiatives

RE 100

RE100 is a collaborative, global initiative of 93 influential businesses committed to 100% renewable electricity, working to massively increase corporate demand for renewable energy.



MARS



Google

Walmart

Johnson & Johnson
FAMILY OF COMPANIES



Goal: streamline and accelerate the corporate procurement of wind and utility-scale solar energy
+190 members



FedEx

Sprint



CAT

amazon

3M

LOCKHEED MARTIN

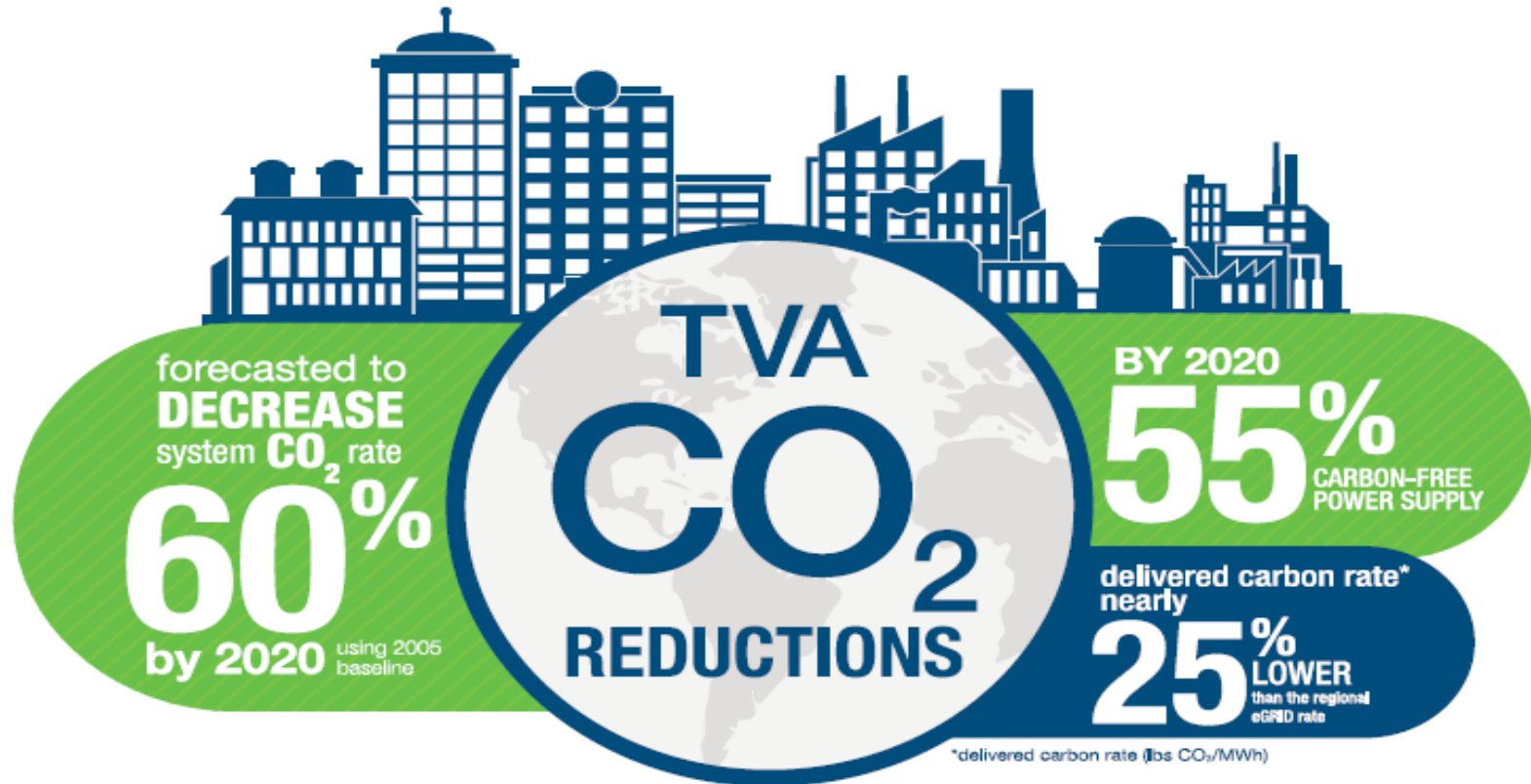




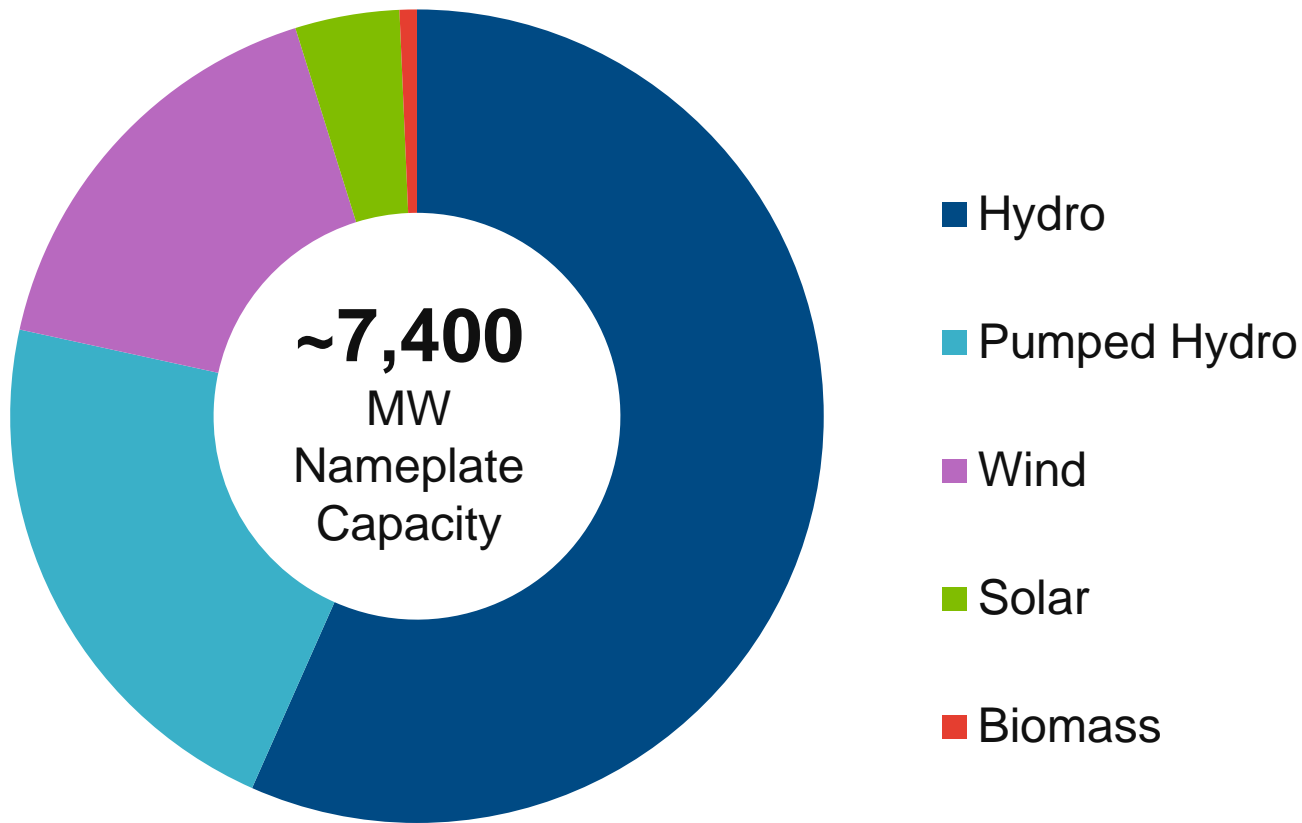
TVA Renewables



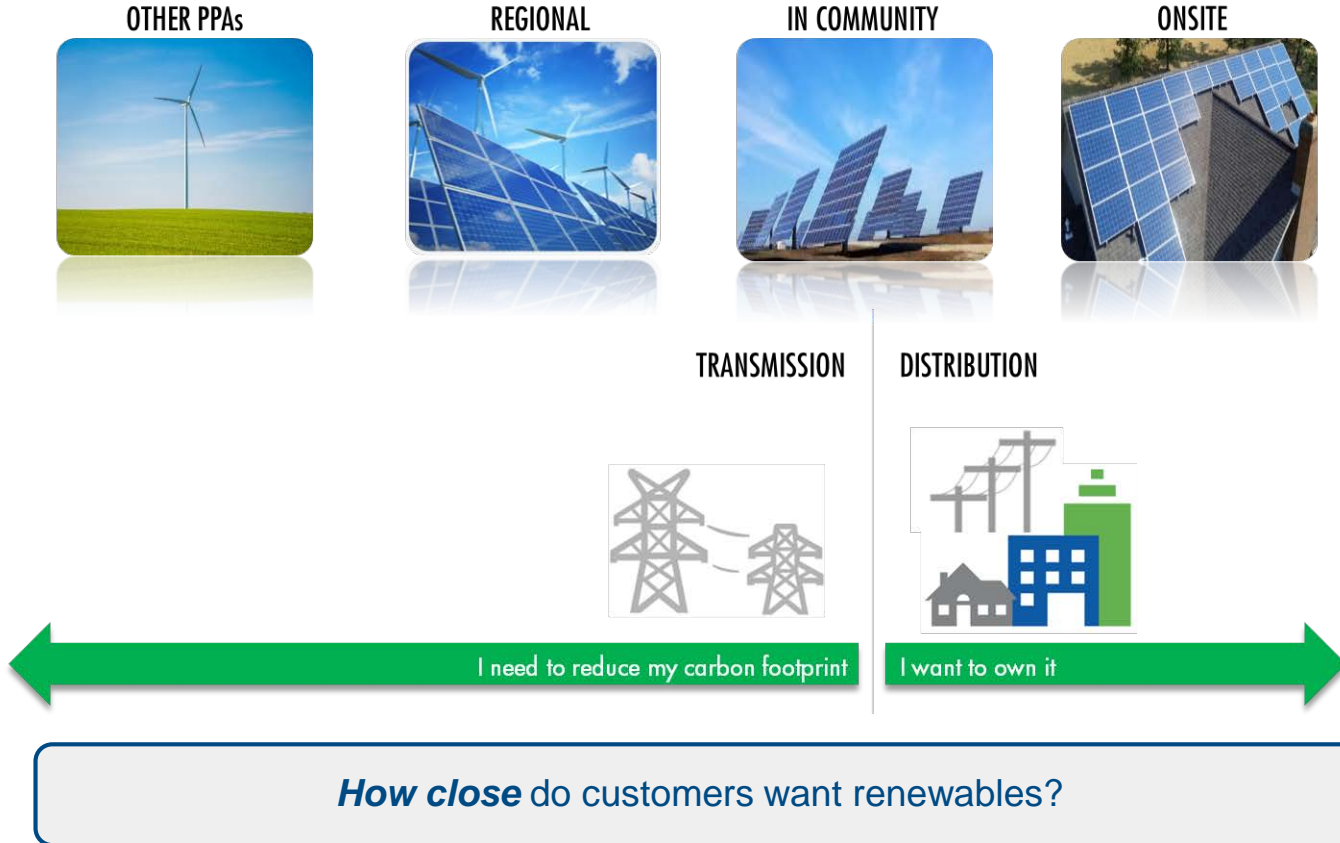
TVA's CO₂ Reductions



TVA's Renewable Portfolio



Proximity of Renewables



TVA Renewable Generation



PUBLIC Renewables
(Utility-Scale)

**Negotiated
Proposals**
> 2MW



COMMUNITY Renewables
(Distribution-Scale)

**Distributed
Solar
Solutions**
50kW – 2MW



PRIVATE Renewables
(Small-Scale)

**Green Power
Providers**
Up to 50kW

Dispersed Power Program up to 80MW (not exclusive to renewable generation)

TVA Renewable Energy Solutions

GENERATION



**Distributed Solar
Solutions**



**Green Power
Providers**

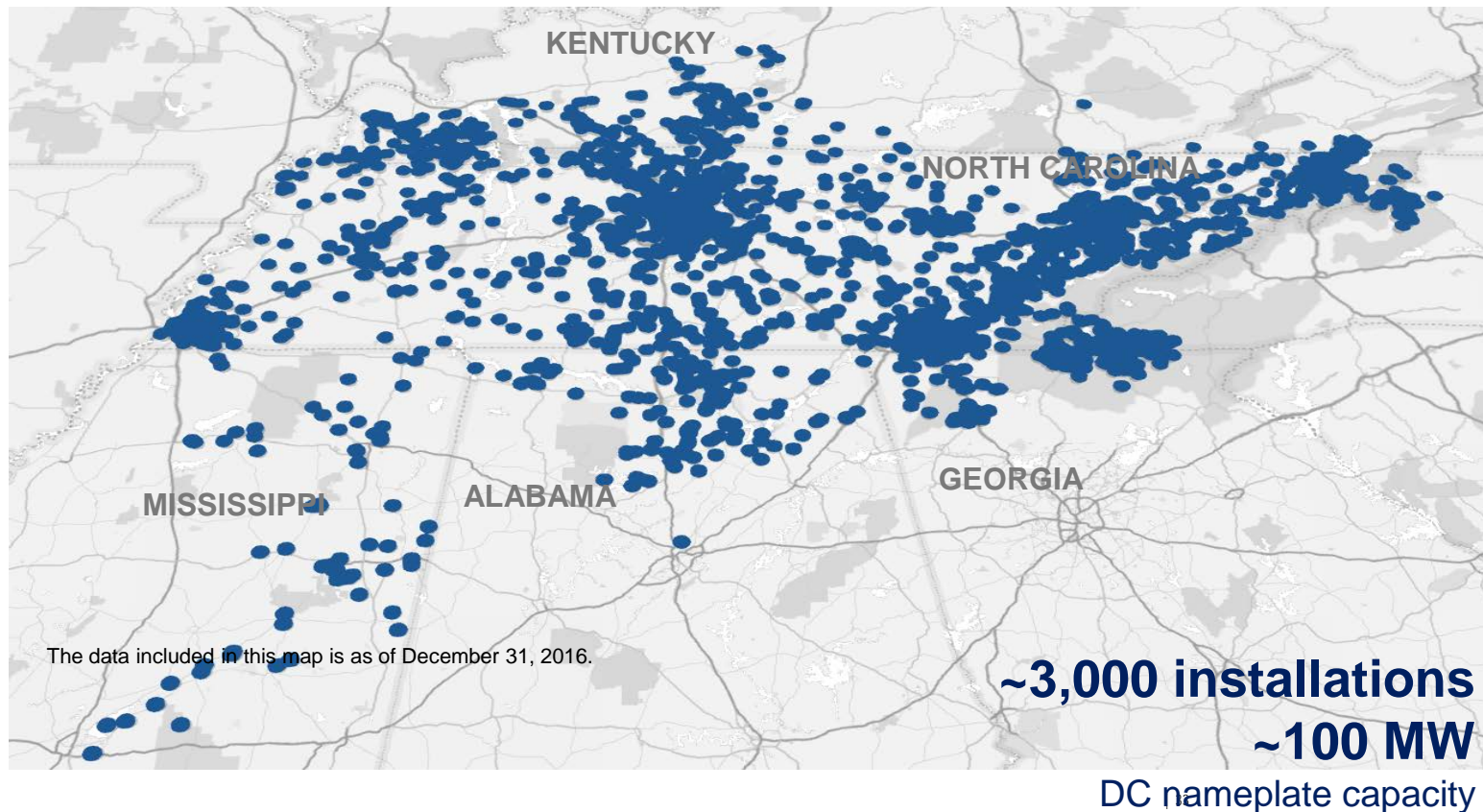


**Green Power
Switch**

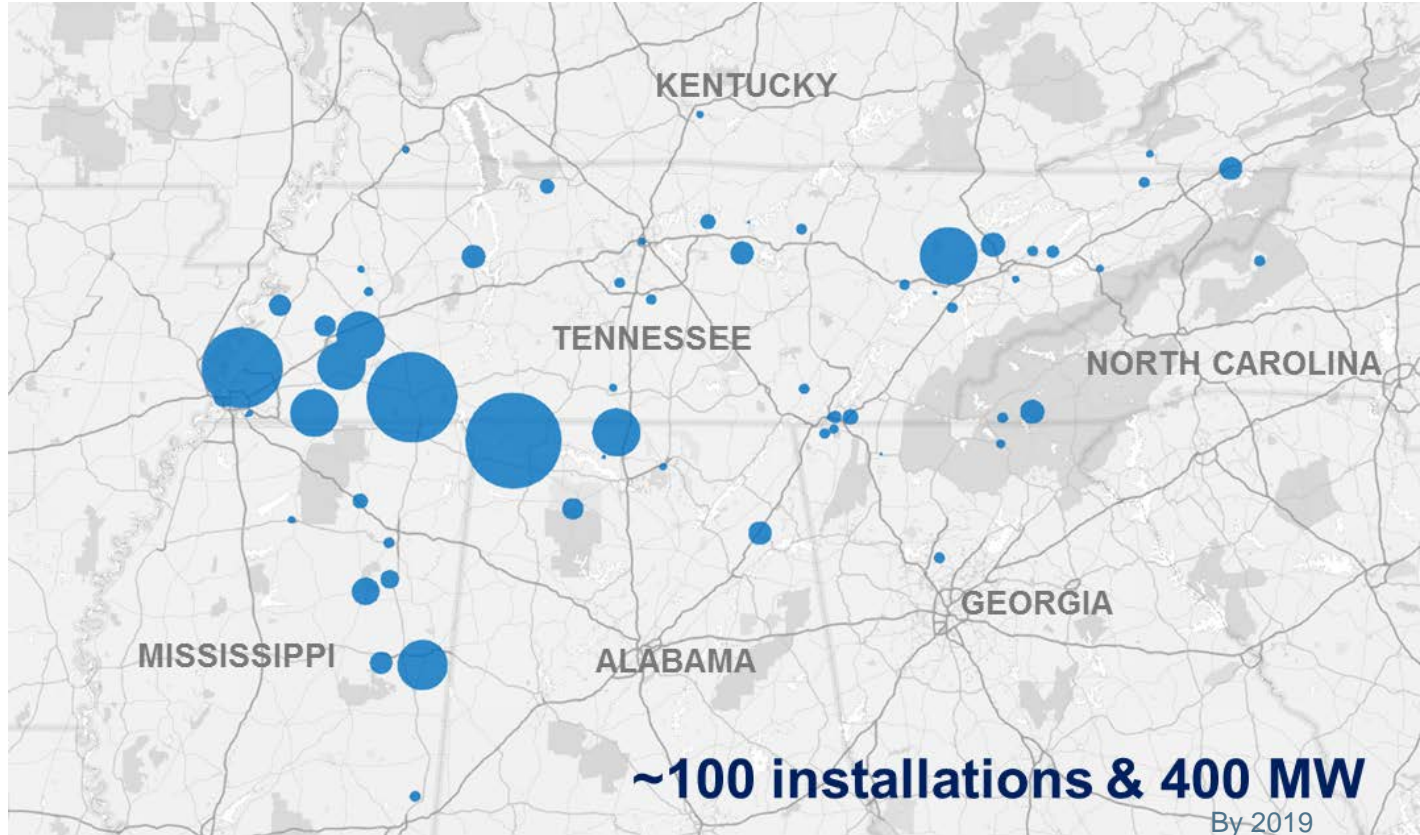


**Southeastern
RECs**

In-Valley Private Renewable Capacity



In-Valley Mid to Large Renewable Capacity



Large Power Purchases

- Solar
 - (2) PPAs for a total of 128 MW
- Wind – SE has typically not been a wind hot spot
 - (8) PPAs for a total of 1,242 MW
 - Primarily from Iowa, Illinois, and Kansas
 - One TN site, Buffalo Mountain in Anderson County, with 15 Vestas V90 1.8 MW Turbines
 - TN capacity factors are around 35%



Renewable Energy Challenges

Challenges Related to Renewables

- Cost Recovery
- Pricing Equity
- Program Design
- Green Tariffs
- Integration Costs
- Hosting Capacity
- Storage
- Regulation

